IN THE CLAIMS:

1. – 8. (Canceled)

9. (Original) A laser resonator apparatus for generating a laser beam having beam quality along two transverse axes that is determined largely by the mode discrimination characteristics of one axis, comprising:

a slab lasing medium having a first and a second end for emitting a laser beam;

an aperture stop with a narrow transverse dimension and an orthogonal wide transverse dimension for defining a beam profile of said laser beam;

a first reflector aligned to reflect said laser beam emitted from said first end of said slab back therein, thereby defining a first end of a resonant cavity;

an anamorphic telescope having a first end aligned to receive said laser beam emitted from said second end of said slab, said telescope operable to reshape said laser beam profile to be substantially symmetrical about its transverse axes and to emit said reshaped laser beam from a second end of said telescope;

a second reflector aligned receive said reshaped laser beam, and operable to reflect said laser beam back into said second end of said telescope, thereby defining a second end of said resonant cavity; and

a beam rotator disposed between said anamorphic telescope and said second reflector operable to rotate the beam profile of said reshaped laser beam by 90 degrees after two passes.

10. (Original) The apparatus of Claim 9 wherein said first reflector is a porro prism, a Benson prism, a mirror, or a resonant reflector.

11. (Original) The apparatus of Claim 9 wherein said second reflector is a porro prism having its roof-line rotated approximately 45° with respect to said narrow and wide transverse dimensions of said laser beam, thereby serving a dual function as said beam rotator.

12. (Original) The apparatus of Claim 9 wherein said second reflector is a Benson prism having its roof-line rotated approximately 45° with respect to said narrow and wide transverse dimensions of said laser beam, thereby serving a dual function as said beam rotator.

13. (Original) The apparatus of Claim 9 wherein said aperture stop is defined by the transverse dimensions of said slab.

14. (Original) The apparatus of Claim 9 wherein said aperture stop is a mechanical aperture stop positioned along the path of said laser beam.

15. (Original) The apparatus of Claim 9 wherein said aperture stop is positioned substantially closer to said first reflector than to said second reflector.

16. (Original) The apparatus of Claim 9 wherein said telescope is positioned substantially closer to said second reflector than to said aperture stop.

17. (Original) The apparatus of Claim 11 further comprising a half-wave plate positioned between said slab and said second reflector.

18. (Original) The apparatus of Claim 9 further comprising an optical switch disposed within said resonator, said optical switch driven to enable pulsed operation through Q-switching, longitudinal mode locking, or cavity dumping.

19. (Original) The apparatus of Claim 18 wherein said optical switch is a voltage driven nonlinear electro-optical switch operated as a Pockels cell.

20. (Original) The apparatus of Claim 9 wherein said slab is a solid-state lasing medium.

21. (Original) The apparatus of Claim 20 wherein said solid-state medium is ytterbium ion doped yttrium-aluminum-garnet.

22. (Original) The apparatus of Claim 9 further comprising an out-coupler.

23. (Original) The apparatus of Claim 22 wherein said out-coupler is a polarization out-coupler or polarizer.

24. (Previously Presented) A laser resonator apparatus for generating a laser beam having beam quality along two transverse axes that is determined by the mode discrimination characteristics of one axis, comprising:

a high aspect ratio solid-state slab lasing medium having a first and a second end for emitting a laser beam, and having a narrow transverse dimension and an orthogonal wide transverse dimension for defining a beam profile of said laser beam;

a first reflector aligned to reflect said laser beam emitted from said first end of said slab back therein, thereby defining a first end of a resonant cavity;

an anamorphic telescope having a first end aligned to receive said laser beam emitted from said second end of said slab, said telescope operable to reshape said laser beam profile to be substantially symmetrical about its transverse axes and to emit said reshaped laser beam from a second end of said telescope;

a porro prism, having its roof-line rotated approximately 45° with respect to said narrow and wide transverse dimensions of said laser beam, and aligned to receive said reshaped laser beam, rotate the beam profile of said reshaped laser beam by 90°, and to reflect said laser beam back into said second end of said telescope, thereby defining a second end of said resonant cavity;

a half-wave plate positioned between said slab and a second reflector and aligned to compensate the polarization rotation caused by said porro prism;

a polarization out-coupler aligned along the path of said laser beam; and

an electro-optic switch positioned along the path of said laser beam and operable to rotate the polarization of said laser beam by 90° upon activation thereof, thereby

causing said out-coupler to out-couple a portion of said laser beam from the laser resonator apparatus.

25. -- 32. (Canceled)

33. (Previously Presented) A method of generating a laser beam having beam quality along two transverse axes that is largely determined by the mode discrimination characteristics of one axis, in a laser resonator having a slab lasing medium, an aperture stop, a first reflector aligned with a first end of the slab, an anamorphic telescope aligned with a second end of the slab, a second reflector aligned with the telescope opposite of the slab and a beam rotator disposed between the anamorphic telescope and the second reflector, the method comprising the steps of:

stimulating emission of a laser beam from the ends of the slab;

limiting a profile of the laser beam by a narrow transverse dimension and an orthogonal wide transverse dimension of the aperture stop;

reflecting, by the first reflector, the laser beam emitted from the first end of the slab back therein, thereby defining a first end of a resonant cavity;

reshaping the laser beam profile, by the telescope, to be substantially symmetrical about its transverse axes;

rotating the beam profile of the reshaped laser beam by approximately 90°, by the beam rotator; and

reflecting the reshaped laser beam back into the telescope, by the second reflector, thereby defining a second end of said resonant cavity.

34. (Original) The method of Claim 33 wherein the second reflector is a roof prism having its roof-line rotated approximately 45° with respect to the narrow and wide transverse dimensions of the laser beam, thereby serving a dual function as said beam rotator.

35. (Original) The method of Claim 33 wherein the second reflector is a porro prism having its roof-line rotated approximately 45° with respect to the narrow and wide transverse dimensions of the laser beam, thereby serving a dual function as said beam rotator.

36. (Original) The method of Claim 33 wherein the second reflector is a Benson prism having its roof-line rotated approximately 45° with respect to the narrow and wide transverse dimensions of the laser beam, thereby serving a dual function as said beam rotator.

37. (Original) The method of Claim 33 wherein the aperture stop is defined by the transverse dimensions of the slab.

38. (Original) The method of Claim 33 wherein the aperture stop is a mechanical aperture stop positioned along the path of the laser beam.

39. (Original) The method of Claim 33 further comprising the step of positioning the aperture stop substantially closer to the first reflector than to the second reflector.

40. (Original) The method of Claim 33 further comprising the step of positioning the telescope substantially closer to the second reflector than to the aperture stop.

41. (Original) The method of Claim 35 further comprising the step of compensating the polarization rotation caused by said porro prism at a position between the anamorphic telescope and the second reflector.

42. (Original) The method of Claim 33 further comprising the steps of Q-switching, longitudinal mode locking, or cavity dumping by means of an optical switch to produce a pulsed output beam.

43. (Original) The method of claim 42 wherein said optical switch is a voltage driven nonlinear electro-optical switch operated as a Pockels cell.

44. (Original) The method of Claim 33 wherein said slab is a solid-state lasing medium.

45. (Original) The method of Claim 33 further comprising the step of out-coupling a portion of laser beam from the laser resonator.

46. (Original) The method of Claim 45 wherein said out-coupling step is accomplished with a polarization out-coupler or polarizer.